IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	
Lu	
Serial No.: 09/745,622	Group Art Unit: 2623
Filed: December 21, 2000	Examiner: Joseph G Ustaris
For: SYSTEM AND METHOD FOR SENDING OUT-OF-BAND SERVICE INFORMATION TO A HOST DEVICE	**Board of Patent Appeals and Interferences**
Confirmation No.: 1117	

Mail Stop: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

In support of the Notice of Appeal filed on May 23, 2007, and pursuant to 37 C.F.R. § 41.37, Appellants present this appeal brief in the above-captioned application.

This is an appeal to the Board of Patent Appeals and Interferences from the Examiner's final rejection of claims 1-15 in the Final Office Action dated February 23, 2007. The appealed claims are set forth in the attached Claims Appendix.

1. Real Party in Interest

This application is assigned to Philips Electronics North America Corporation, the real party in interest.

2. Related Appeals and Interferences

There are no other appeals or interferences that would directly affect, be directly affected, or have a bearing on the instant appeal.

3. Status of the Claims

Claims 1-15 have been rejected in the Final Office Action. The final rejection of claims 1-15 is being appealed.

4. Status of Amendments

All amendments submitted by Appellants have been entered.

5. Summary of Claimed Subject Matter

The present invention, as recited in independent claim 1, is directed to a system for sending out-of-band (OOB) service information from a service provider comprising a point of deployment (POD), the construction of out-of-band (OOB) transport stream (TS) packets, the insertion of said packets, and a set-top box. (See Specification p. 4 ll. 3-5; p. 6 ll. 14-17; Fig. 1). The POD module receives an in-band (IB) TS including IB TS packets. (See Specification p. 8 ll. 15-19; Fig. 2). The POD module also includes a processor for processing OOB service information from a service provider. The construction of OOB TS packets is done using OOB service information, and identifying unoccupied gaps in the IB TS, and inserting said packets into the unoccupied gaps of the IB TS. The OOB and IB packets are then sent to the set-top box to be processed using a TS channel. (See Specification p. 9, ll. 13-23; Fig. 2).

The present invention, as recited in independent claim 4, is directed to a method of sending OOB service information from a service provider between a data module (12) and a host device (10). (See Specification p. 7, ll. 2-6; Fig. 1). The method includes first receiving an

IB TS at a data module (12), followed by receiving OOB service information. The OOB TS is then constructed using OOB service information and identifying unoccupied gaps in the IB TS. Once the gaps are identified, OOB are inserted into the unoccupied gaps and the packets are then sent to a host device (10). (See Specification p. 9, ll. 13-23; Fig. 2)

The present invention, as recited in independent claim 7, is directed to a data module (12) for use with a host device (10), said data module (12) receiving an IB TS including IB packets. (See Specification p. 7, ll. 2-6; Fig. 1). The data module (12) comprises a processor (18) for processing OOB service information, constructing OOB TS packets using the OOB service information. (See Specification p. 6, ll. 6-7; Fig. 1). The data module (12) identifies unoccupied gaps in the IB TS and inserts the OOB packets into the unoccupied gaps creating a single TS, which is sent to a host device (10). (See Specification p. 9, ll. 13-23; Fig. 2)

The present invention, as recited in independent claim 12, is directed to a host device (10) comprising a processor (26) for processing OOB service information. The OOB service information is received from the OOB TS packets sent by a data module in the unoccupied gaps in an IB TS. (See Specification p. 9, ll. 13-23; Fig. 2)

6. Grounds of Rejection to be Reviewed on Appeal

I. Whether claims 1-15 are unpatentable under 35 U.S.C. § 103(a) over U.S. Pat. No. 6,628,891 to Vantalon et al. (hereinafter "Vantalon") in view of U.S. Pat. Pub. No. 20030103532 to Bertram et al. (hereinafter "Bertram") in further view of U.S. Pat. Pub. No. 20020101991 to Bacon et al. (hereinafter "Bacon").

7. Argument

I. The Rejection of Claims 1-15 Under 35 U.S.C. § 103(a) Over Vantalon in view of Bertram in further view of Bacon Should Be Reversed.

A. The Examiner's Rejection

In the Final Office Action, the Examiner rejected claims 1-15 under 35 U.S.C. § 103(a) as being unpatentable over Vantalon in view of Bertram in further view of Bacon. (See 02/23/07 Office Action, p. 2).

Vantalon is directed toward conditional access method and apparatus that are provided for use with digital television receivers and other digital broadband receivers. The methods and apparatus are capable of handling several different signal transmission protocols in an automatic flexible manner. An input unit is utilized to analyze and tag incoming data bytes so that further processing operations are less dependent on the transmission format being received. A cipher unit is utilized to adapt, in real time, the scrambling and descrambling performances to match the requirements of the transmission network and the receiving apparatus. A filtering mechanism is utilized to filer and handle multiple asynchronous data streams in a parallel manner. (See Vantalon Abstract).

Bertam is directed toward a method and apparatus for transporting encoding asset data and content data. The transport encoded content data gets multiplexed with a plurality of NULL transport packets to provide a "place holder" for asset data transport packets, and replacing the NULL transport packets with asset data transport packets prior to transmitting the multiplexed transport stream to a set top box. (See Bertram Abstract).

Bacon is directed a subscriber television system with a host terminal. The system allows for the identification of individual packets from two separate MPEG transport streams that have been multiplexed together for decoding by a single external condition access or point-of-deployment (POD). The decoding of two separate MPEG transport streams allows for the use of multiple tuner host terminals for such function as picture-in-picture (PIP) or the recording of one program while watching another program. (See Bacon Abstract).

B. The Cited Patents Do Not Disclose Inserting The OOB TS Packets In The Unoccupied Gaps And Sending The OOB TS Packets And The IB TS Packets To A Set-Top Box Using A Transport Stream Channel, As Recited In Claim 1.

Claim 1 recites, "inserting the OOB TS packets in the unoccupied gaps and sending the OOB TS packets and the IB TS packets to a set-top box using a transport stream channel." The Examiner asserts that this recitation of claim 1 is disclosed in Bertram. (See 2/23/07 Office Action, p. 3). Appellants respectfully disagree.

The Examiner asserts that "inserting the OOB TS packets in the unoccupied gaps and sending the OOB TS packets and the IB TS packets to a set-top box using a transport stream channel," as recited in claim 1, is met by the placing of NULL packets in the content stream as a place holder for the insertion of asset packets as described in Bertram. However, the reservation of space inside the content stream by a NULL packet is not the same as the insertion of OOB packets when the system detects a gap in the IB TS. In Bertram, the system specifies areas within the transport stream where it wants to place asset packets. (See Bertram par. [0042]). When an area is identified, it places a NULL packet within the data stream. This reserves a spot in the data stream and prevents any content packets from being transmitted in that space. The system then replaces the NULL packets with asset packets to be transmitted along the data stream. In Bertram, once a NULL packet has been placed, a content packet cannot be placed in the same space, even if an asset packet has not been placed there yet. (See Bertram par. [0024]). In contrast, claim 1 recites inserting OOB packets in an empty space unoccupied by an IB packet. Thus, an IB packet can be placed in the unoccupied gaps at any time up until an OOB packet is placed in the unoccupied gap. The unoccupied gap is not reserved, while the empty space is reserved by a NULL packet in Bertram.

The Examiner also equates a NULL packet being placed inside the transport stream, as described in Bertram, to the "identifying unoccupied gaps in the IB TS," as recited in the claim 1. These, however, are not the same. When a packet is transmitted from one destination to another, the packet contains two types of information. The first type of

information is the information required for the packet to know its starting point and its destination, usually called the header. The second type of information is the payload, or actual information used at the destination, such as video information. Those skilled in the art will understand that a NULL packet contains the header information, but does not have a payload. "A NULL packet is a particular undeclared transport packet that belongs to nobody. Its payload is undefined." (See Leonardo Chiariglione, *MPEG Systems FAQ,* p. 6 of 7 (last modified Aug. 27, 2006) http://www.chiariglione.org/MPEG/faq/mp2-sys/mp2-sys.htm. Printout attached hereto in the Evidence Appendix). So for the system in Bertram to reserve a packet of X bits it must create a NULL packet, having a size of X bits to reserve the space in the transport stream. Thus, in the system of Bertram, there are physical packets occupying a location in the data stream before an asset packet is inserted. So, while the NULL packet may not contain any data readable by the receiving device, it still must contain data to reserve the necessary space for the latter insertion of the asset packet(s). That is a NULL packet is not an unoccupied gap in the data stream.

In contrast, claim 1 specifically recites, "identifying unoccupied gaps in the IB TS, inserting the OOB TS packets in the unoccupied gaps." In Bertram, however, an asset packet is placed in a space where a NULL packet is located. (See Bertram par. [0042]). These two methods of inserting packets inside of a data stream are different. The system in Bertram does not have the ability to place an asset packet inside of an empty space. The system can only place an asset packet in a space already occupied by a NULL packet. Thus, Appellants respectfully submit that Bertram does not teach or suggest, "inserting the OOB TS packets in the unoccupied gaps and sending the OOB TS packets and the IB TS packets to a set-top box using a transport stream channel," as recited in claim 1. Accordingly, Appellants respectfully request that the Board overturn the Examiner's rejection of claim 1. Because claims 2 and 3 depend from and, therefore, include all the limitations of claim 1, it is respectfully submitted that these claims are also allowable.

Independent claim 4 recites "identifying unoccupied gaps in the IB TS; inserting at least one of the OOB TS packets into the unoccupied gap." Appellants respectfully submit that this claim is allowable for at least the same reasons stated above with reference to claim 1

and the Board should overturn the Examiner's rejection of this claim. Because claims 5, 6 and 15 depend from and, therefore, include all the limitations of claim 4, it is respectfully submitted that these claims are also allowable.

Independent claim 7 recites, "identifying unoccupied gaps in the IB TS, inserting the OOB TS packets in the unoccupied gaps and sending the OOB TS packets and IB TS packets to a host device using a transport stream channel." Appellants respectfully submit that this claim is allowable for at least the same reasons stated above with reference to claim 1 and the Board should overturn the Examiner's rejection of this claim. Because claims 8-11 depend from and, therefore, include all the limitations of claim 7, it is respectfully submitted that these claims are also allowable.

Independent claim 12 recites, "wherein the OOB service information is received from OOB transport stream (TS) packets sent by a data module in unoccupied gaps in an IB TS." Appellants respectfully submit that this claim is allowable for at least the same reasons stated above with reference to claim 1 and the Board should overturn the Examiner's rejection of this claim. Because claims 13 and 14 depend from and, therefore, include all the limitations of claim 12, it is respectfully submitted that these claims are also allowable.

Conclusion

For the reasons set forth above, Appellants respectfully request that the Board reverse the rejection of the claims by the Examiner under 35 U.S.C. § 103(a), and indicate that claims 1-15 are allowable.

Please direct all future correspondence to:

Larry Liberchuk, Esq.
IP Counsel

Philips Intellectual Property & Standards
P.O. Box 3001
Briarcliff Manor, NY 10510-8001
Phone: (914) 333-9618
Fax: (914) 332-0615
Email: larry.liberchuk @philips.com

Respectfully submitted,

Date: 7/14/07

By:
Oleg F. Kaplun (Reg. No. 45,559)

Fay Kaplun & Marcin, LLP
150 Broadway, Suite 702
New York, NY 10038
Tel: (212) 619-6000
Fax: (212) 619-0276

CLAIMS APPENDIX

1. (Previously Presented) A system for sending out-of-band (OOB) service information from a service provider, the system comprising:

a point of deployment (POD) module which receives an in-band (IB) transport stream (TS) including IB TS packets, the POD module including a processor for processing OOB service information from a service provider, constructing OOB TS packets using the OOB service information, identifying unoccupied gaps in the IB TS, inserting the OOB TS packets in the unoccupied gaps and sending the OOB TS packets and the IB TS packets to a set-top box using a transport stream channel; and

wherein the set-top box includes a processor for processing the OOB TS packets.

2. (Original) The system of claim 1, wherein the point of deployment module further includes a buffer for storing the OOB TS packets.

3. (Previously Presented) The System of claim 2, wherein the point of deployment module sends the OOB TS packets between two consecutive IB TS packets of the IB TS without delaying the two consecutive IB TS packets.

4. (Previously Presented) A method of sending out-of-band (OOB) service information from a service provider between a data module and a host device, the method comprising the steps of:

receiving an in-band (IB) transport stream at a data module;
receiving out-of-band service information at the data module;
constructing OOB transport stream (TS) packets using the OOB service information;
identifying unoccupied gaps in the IB TS;
inserting at least one of the OOB TS packets into the unoccupied gap; and
receiving the OOB TS packets at a host device.

5. (Original) The method of claim 4, wherein the data module is a point of deployment module.

6. (Previously presented) The method of claim 4, wherein the host device is a set-top box.

7. (Previously Presented) A data module for use with a host device, the data module receiving an in-band (IB) transport stream (TS) including IB TS packets, the data module comprising:

a processor for processing out-of-band (OOB) service information, constructing OOB TS packets using the OOB service information, identifying unoccupied gaps in the IB TS, inserting the OOB TS packets in the unoccupied gaps and sending the OOB TS packets and IB TS packets to a host device using a transport stream channel.

8. (Original) The data module of claim 7, further including a buffer for storing the OOB TS packets.

9. (Previously Presented) The data module of claim 8, wherein the data module sends the OOB TS packets between two consecutive IB TS packets the IB TS without delaying the two consecutive IB TS packets.

10. (Previously presented) The data module of claim 7, wherein the data module is selected from the group consisting of a point of deployment module, a wireless data interface appliance, a smartcard, a personal computer and an internet interface appliance.

11. (Original) The data module of claim 7, wherein the host device is a set-top box.

12. (Previously Presented) A host device for use with a data module, the host comprising:

a processor for processing out-of-band (OOB) service information, wherein the OOB service information is received from OOB transport stream (TS) packets sent by a data module in unoccupied gaps in an in-band TS.

13. (Original) The host device of claim 12, wherein the host is a set-top box.

14. (Previously Presented) The host device of claim 13, wherein the processor is further adapted for receiving the OOB TS packets between two consecutive transport stream packets of the in-

band TS, wherein the two consecutive transport stream packets are not delayed from their original timing by the OOB TS packets.

15. (Previously presented) The method of claim 4, further comprising the step of buffering the OOB TS packets.

EVIDENCE APPENDIX

Leonardo Chiariglione, *MPEG Systems FAQ* (last modified Aug. 27, 2006) http://www.chiariglione.org/MPEG/faq/mp2-sys/mp2-sys.htm, attached hereto, 6 of 7 pages printed on 07/18/07.

RELATED PROCEEDING APPENDIX

No decisions have been rendered regarding the present appeal or any proceedings related thereto.

MPEG-2 Systems

1. What is MPEG-2 Systems?

MPEG-2 Systems is an ISO/IEC standard (13818-1) that defines the syntax and semantics of bitstreams in which digital audio and visual data are multiplexed. Such bitstreams are said to be MPEG-2 Systems compliant. This specification does not mandate, however, how equipment that produces, transmits, or decodes such bitstreams should be designed. As a result, the specification can be used in a diverse array of environments, including local storage, broadcast (terrestrial and satellite), as well as interactive environments.

2. Who developed this standard?

This standard was industry driven, and complemented the MPEG-2 activities in audio and video coding. The consumer TV industry actively participated in the definition of MPEG-2 Systems, to ensure that a low-complexity receiver can be built at a reasonable cost.

3. Which industries have adopted this standard?

The list is extensive and continuously growing: consumer TV (cable, satellite and terrestrial broadcast), Video on Demand, Digital Video Disc, personal computing, card payment, test and measurement, etc.

4. Which standard bodies have adopted this standard?

In Europe, DVB (Digital Video Broadcast). In the USA, FCC (Federal Communications Commission), ATSC, SCTE. In Japan, MITI/JISC. The DAVIC consortium. DVD.

5. Why do I need to be MPEG-2 Systems compliant?

In the design of equipment, you have to be MPEG-2 Systems compliant for several reasons. First, if your equipment has to be compliant with DVB, FCC, JISC, ATSC, SCTE, DVD, or DAVIC requirements, as these bodies require MPEG-2 Systems compliance. Secondly, because your design can rely on Integrated Circuits developed in that area. Finally, your application will be opened to all the MPEG-2 Systems world, and will be usable over a large number of networks. The MPEG-2 Systems standard enables the widest interoperability in digital video and audio applications and services.

6. Is there a reference implementation?

Yes, reference bitstreams are described in the MPEG-2 document TR 13813-5.

7. What are the different MPEG-2 Systems components?

MPEG-2 Systems provides a two layer multiplexing approach. The first layer is dedicated to ensure tight synchronisation between video and audio. It is a common way for presenting all the different materials which require synchronisation (video, audio, and private data). This layer is called Packetized Elementary Stream (PES). The second layer is dependent on the intended communication medium. The specification for error free environments such as local storage is called MPEG-2 Program Stream, while the specification addressing error prone environments is called MPEG-2 Transport Stream.

8. What is the difference between MPEG-1 Systems and MPEG-2 Systems?

MPEG-2 Systems mandated compatibility with MPEG-1 Systems. The MPEG-2 Program Stream is designed for that purpose. MPEG-2 Systems also addresses error prone environments, and provides all the hooks for Conditional Access systems.

9. What is the difference between an MPEG-1 Systems stream and an MPEG-2 Systems Program stream?

The major difference lies on the signalling which is present in MPEG-2 Program Streams and was absent in MPEG-1 Systems. A minor difference also exists in the PES format.

10. Is the MPEG-2 Transport Stream a transport multiplex?

No, MPEG-2 transport is rather a service multiplex. No mechanism, within the syntax, exists to ensure the reliable delivery of the transported data. MPEG-2 transport relies on underlying layers for such services. MPEG-2 transport requires the underlying layer to identify the transport packets and to indicate in the transport packet header, when a transport packet has been erroneously transmitted. The MPEG-2 Transport Stream is so named to signify that it is the input to the Transport layer in the OSI seven layer network model. It is not, in itself, the Transport layer.

11. What is carried in MPEG-2 Transport Streams?

MPEG-2 Transport Streams carry transport packets. These packets carry two types of information: the compressed material and the associated signalling tables. A transport packet is identified by its PID (Packet Identifier). Each PID is assigned to carry data belonging either to one particular compressed data source (and only this data source) or one particular signalling table. The ordered sequence of packets with a given PID may be considered as one data stream. The compressed data source may be derived from either video, audio or data elementary streams. These elementary streams may be tightly synchronized (as it is usually necessary for Digital TV programs, or for Digital Radio programs), or not synchronised (in the case of programs offering downloading of software or games, as an example).

The associated signalling tables consist of the description of the elementary streams which are combined to build programs, and in the description of those programs. Tables are carried in sections. The signalling tables are called PSI (Program Specific Information).

12. Why are Transport packets 188 bytes long?

Because MPEG-2 wanted these packets to be carried over ATM. At that time, according to the AAL which was envisaged, ATM cells were supposed to have a payload of 47 bytes.

188 = 4 * 47.

13. What about the programs carried within the MPEG-2 Transport Stream?

There is a description of each program carried within the MPEG-2 Transport Stream. This description usually requires a particular table, the Program Map Table, with one table per program. This table is only sent periodically. On the other hand, the elementary streams which make up a program are continuously carried in PES streams. In that sense it could be said that an MPEG-2 Transport Stream does not carry programs, but only carries elementary streams and the instructions required to associate particular elementary streams into particular programs.

14. Why do so many application use MPEG-2?

One of the attractive aspects of MPEG-2 comes from its fundamental requirement to be generic.

Another reason is that in all the syntax and signalling provisions are made to allow applications to develop their own private syntaxes and signalling. A lot of private needs may

be satisfied.

15. What is the main assumption made by MPEG-2 Systems?

That the network is ideal, and that each byte is transmitted with a constant delay.

16. What is a syntax?

Generally speaking, a syntax specifies the structure of a bitstream: how different parameters, tags, etc., are mapped and laid out on the bitstream. For multiplexing purposes, it is important for the syntax to provide patterns which can be recognized with an extremely high degree of confidence. These patterns are called synchronisation patterns. In addition, an indication of time and of the bit rate of the bitstream may also be provided.

Equipped with such elements, a bitstream corresponding to an MPEG-2 syntax is a self contained bitstream on which a receiver can slave itself, in order to acquire that bitstream exactly synchronised with the production of that bitstream. However, time indication and bit rate indication are not mandatory.

17. What is a time stamp?

They are two types of time stamps:

- The first type is usually called a reference time stamp. This time stamp is the indication of time mentioned in the previous question. Reference time stamps are to be found in the PES syntax (ESCR), in the program syntax (SCR), and in the transport syntax (PCR).
- The second type of time stamp is called DTS (Decoding Time Stamp) or PTS (Presentation Time Stamp). They indicate the exact moment where a video frame or an audio frame has to be decoded or presented to the user respectively.

18. Are time stamps mandatory?

No, they are not mandatory. Some applications like Digital TV broadcast, where tight synchronisation is required, will make an extensive use of time stamps. In that case both reference time stamp and DTS/PTS are used. In other cases (game or software downloading for example) neither reference nor DTS/PTS time stamps are necessary. DTS and PTS time stamps are not relevant if reference time stamps are not present.

19. Where are the PTSs and DTSs inserted?

They are inserted as close as possible to the portions of compressed video, audio, or data to which they apply. Precisely, this means that they are inserted in the PES packet headers, a syntax which is common to all data sources.

20. What is PSI?

PSI (Program Specific Information) carries the signalling. PSI has no synchronisation pattern in the section headers.

21. What is the difference between a PES packet and a PSI section?

A PES packet is a way to uniformly packetize elementary streams. Embedded in PES packets, elementary streams may be synchronized with time stamps. They are not protected. The PES packets may be of variable length, which allows them to be also of fixed length. PES packets may be rather long packets. As elementary streams are continuous streams, it is also possible to know that a PES packet is finished because the next PES packet arrives. Therefore, sometimes a length indication is not even relevant (for video PES packets).

A PSI section is a way to carry a portion of a PSI table. A PSI section is a way to uniformly represent signalling. PSI sections are not synchronized. They may be protected by a CRC. The sections are of a variable length. They are rather small. The length is always relevant. It is the only mechanism to go from one section to the next section when they are carried in the same packet. An update mechanism is also supported which allows association of a version number to a section.

22. What will be found embedded in a PES packet?

Continuous streams are to be found within the PES packets: They consist of either video, audio or data material. The video may be of different kinds (MPEG-1, MPEG-2), and the same for audio. There is no assumption about elementary data streams. One of the first uses is for subtitling.

23. What will be found in PSI sections?

Signalling is carried in PSI sections. Conditional Access messages are usually also carried in PSI sections. Downloading of data will almost certainly use the PSI section mechanism.

24. Did MPEG-2 do research on Conditional Access methods?

MPEG-2 only provided hooks for the Conditional Access systems:

- the means to carry the messages (key words in ECMs, and entitlement in EMMs),
- and the means to declare them (in PSI tables, in Transport packet headers, and in PES headers). The syntax of the messages is determined by each particular Conditional Access system.

25. Why is PSI information not synchronised?

Because tight synchronisation between signalling and elementary streams was not required. It is enough, generally speaking, to signal an event a little in advance. In some cases, however, that makes dynamic changes quite tricky, especially when elementary streams are scrambled, or when a program changes from an "in the clear" state to a scrambled state.

26. Why is Video or Audio material not protected at MPEG-2 systems level?

The error concealment techniques are implemented within the audio and the video layers. For error protection MPEG-2 Systems relies on the underlying layer to deliver transport packets with a BER rate around 10-10.

27. Is the MPEG-2 transport stream a two or a three level multiplex?

It is a two layer multiplex, as the pure audio and video material are first packetized in PES packets and secondly packetized in transport packets. Transport packets are multiplexed. It is not a three level multiplex as there is no packetization related to programs.

28. Is the MPEG-2 program stream a two or a three level multiplex?

It is a one layer multiplex, as the pure audio and video material are only packetized in PES packets. PES packets are then multiplexed. It is not a two level multiplex as there is no packetization related to the carried program.

29. What is the use of NULL packets?

They are usually used as a provision for rate stuffing in order to avoid the bottleneck of insufficient resources. Usually transport packets have to be declared in the PSI information tables. A NULL packet is a particular undeclared transport packet that belongs to nobody. Its payload is undefined. Some applications use NULL packets in order to insure a good and quick synchronization mechanism, as their modulation scheme is not aligned on the start of transport packets.

30. Is the bitstream rate always explicitly carried?

Yes for the PES syntax and the MPEG-2 program syntax.

No for the MPEG-2 transport syntax. For that syntax, the transport rate may appear in the PSI information.

31. How do DVB and ATSC use MPEG-2 transport?

In defining their own operational rules and implementation guidelines. They specified also their own signalling (Service Information) using the already defined MPEG-2 private sections. Modulation schemes adapted to satellite, to cable and to terrestrial broadcast have been adopted. Physical interfaces between equipment have been specified. Parameters, relevant for real-time and offline measurements, have been specified.

32. Are there any error detection mechanisms?

Two CRCs are to be found:

- one in the PES syntax, but its purpose is to check the error robustness of a network link. It is a CRC calculated over the previous transmitted PES packet.
- The second in the PSI information. It is a way to ensure that a section has not been corrupted.

That is why sections have to be short, in order for the CRC to be efficient.

33. What is a system target decoder model?

A system target decoder (STD) model is a virtual decoder. There are two models, one within

the MPEG-2 program syntax (the P-STD), the other within the MPEG-2 transport syntax (The T-STD). A model defines buffer sizes, their input and output rates, and timing constraints related to time stamps values.

34. Why have the STD models been invented?

Not to be implementation dependent. The first model comes from MPEG-1 Systems. Some of the assumptions in the T-STD are even not realistic at all: buffers, for instance, when decoding occurs are supposed to be emptied instantaneously.

35. What are the constraints imposed by the T-STD model?

They apply to different elements:

- Timing information:
  if the time stamps (PTS, DTS) are wrong the elementary stream buffers may underflow or overflow.
- Multiplex scheduling:
  If there are too many consecutive packets of the same elementary stream in a transport stream buffers will overflow.
- Constraints on the manipulation of MPEG-2 transport streams:
  The T-STD specifies the bounds within which remultiplexing of a transport stream is possible.

Webmaster